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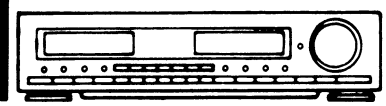
Service Manual



ORDER NO.
ARP1910

STEREO GRAPHIC EQUALIZER

GR-Z460

- This manual is applicable to the ZEBZ type.

● As to the system composition, refer to the S-777D/S-555D service manual ARP1930.

● Connect GR-Z2460 to A-Z460 or A-Z360. Do not connect to A-Z560.

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1. P.C.B.'S PART LIST

NOTES:
- *Parts without part number cannot be supplied.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω	*56×10 1→561*	*RD1/4PS□□□J*
47kΩ	*47×10 3→473*	*RD1/4PS□□□J*
0.5Ω	*OR5*	*RN2H□□□K*
1Ω	*010*	*RS1P□□□K*

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*563×10 1→5621*	*RN1/4R□□□□F*

Mark NO	Description	Part NO
	GE CONTROL ASS'Y (AWK1233)	
	GE CONTROL Assembly is split into CONTROL Assembly and DISPLAY Assembly.	
	DISPLAY ASS'Y	
	SEMICONDUCTORS	
	IC251 LOGIC IC	M74LS42P
	D251-262 DIODE	HSS104-02
	D263-267 LED(RED)	AEL1065-A
	D268 LED	AEL1083
	D269,270 LED	AEL1104
	SWITCHES	
	S251-278 SWITCH	ASG1029-A
	S279 SWITCH	ASG-711
	S280-284 SWITCH	ASG1029-A
	S285 ROTARY ENCODER	ASX1007
	RESISTOR	
	R101-126 CARBONFILM RESISTOR	RD1/8PM□□□J
	R251-256 CARBONFILM RESISTOR	RD1/8PM□□□J
	OTHERS	
	V251,252 FL TUBE	AAV1084
	CONTROL ASS'Y	
	SEMICONDUCTORS	
	IC101-106 OP-AMP IC	NJM4558DXP
	IC107 LOGIC IC	TC4051BP
	IC108	PD3141 (PD3162)
	Q101-103 TRANSISTOR	DTC124ES
	Q104-106 TRANSISTOR	2SC2458
	Q107-113 TRANSISTOR	DTC124ES
	Q114 TRANSISTOR	2SA1048
	Q115,116 TRANSISTOR	2SC2458
	D101-115 DIODE	HSS104-02
	D117 DIODE	HSS104-02
	D118 ZENER DIODE	RD5.6ESB
	D119 DIODE	HSS104-02

Mark NO	Description	Part NO
	COIL & FILTER & TRANSFORMERS	
	L101 AXIAL INDUCTOR	LAU101K
	CAPACITOR	
	C101,102 CERAMIC CAPACITOR	CKCYX823M25
	C103 CERAMIC CAPACITOR	CKCYX473M25
	C104,105 CERAMIC CAPACITOR	CKCYX333M25
	C106 CERAMIC CAPACITOR	CKCYX473M25
	C107,108 CERAMIC CAPACITOR	CKCYX123M25
	C109 CERAMIC CAPACITOR	CKCYX473M25
	C110,111 CERAMIC CAPACITOR	CKCYB472K50
	C112 CERAMIC CAPACITOR	CKCYX473M25
	C113,114 CERAMIC CAPACITOR	CKCYB182K50
	C115 CERAMIC CAPACITOR	CKCYX473M25
	C116,117 CERAMIC CAPACITOR	CKCYB821K50
	C118 CERAMIC CAPACITOR	CKCYX473M25
	C119,120 CERAMIC CAPACITOR	CKCYB391K50
	C121,122 CERAMIC CAPACITOR	CKCYX473M25
	C123 ELECTR.CAPACITOR	CEAS221M10
	C124 CERAMIC CAPACITOR	CKCYX473M25
	C125 CEA (47000/5.5V)	ACH1070
	C126 ELECTR.CAPACITOR	CEAS100M25
	C127 ELECTR.CAPACITOR	CEAS221M10
	C128,129 ELECTR.CAPACITOR	CEAS101M50
	C130 ELECTR.CAPACITOR	CEAS470M10
	C131 CERAMIC CAPACITOR	ACG1020-A
	C132 CERAMIC CAPACITOR	CKDYF103Z50
	RESISTOR	
	R127-175 CARBONFILM RESISTOR	RD1/8PM□□□J
	R177-181 CARBONFILM RESISTOR	RD1/8PM561J
⚠	R184 METAL OXIDE RESISTOR	RRS2LMF681J
	R185 CARBONFILM RESISTOR	RD1/8PM101J
	R201-239 CARBONFILM RESISTOR	RD1/8PM□□□J
	OTHERS	
	CN1 13P JUMPER CONNECTOR	KPE13
	X101 CERAMIC RESONATOR	ASS1010

PIONEER®
The Art of Entertainment

Service Manual

ORDER NO.
ARP2160

STEREO GRAPHIC EQUALIZER

GR-Z370

- **Refer to the service manual ARP1910, GR-Z460/ZEBZ.**
- **This manual is applicable to the GR-Z370/ZEBZ type.**
- **This product is a component of systems. As to the system composition, refer to the system manuals.**
- **This product does not function properly when independent ; to avoid malfunctions, be sure to connect it to the prescribed system components, otherwise damage may result.**

CONTRAST OF MISCELLANEOUS PARTS

GR-Z370/ZEBZ type is the same as the GR-Z460/ZEBZ type with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		GR-Z460/ZEBZ	GR-Z370/ZEBZ	
	Rotary knob	AAA1005	AAA1003	
	Display panel	AAK1853	AAK2117	
	Code with plug	ADE1068	ADE1108	
	Packing case	AHD1780	AHD2010	
	Front panel assembly	AMB1577	AMB1774	

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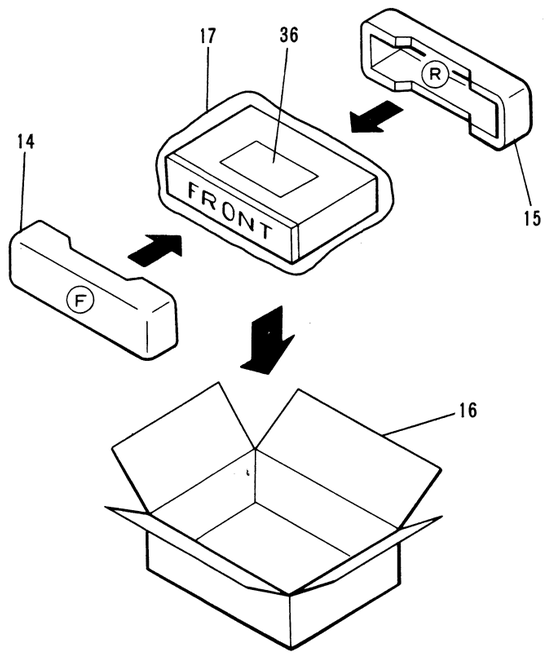
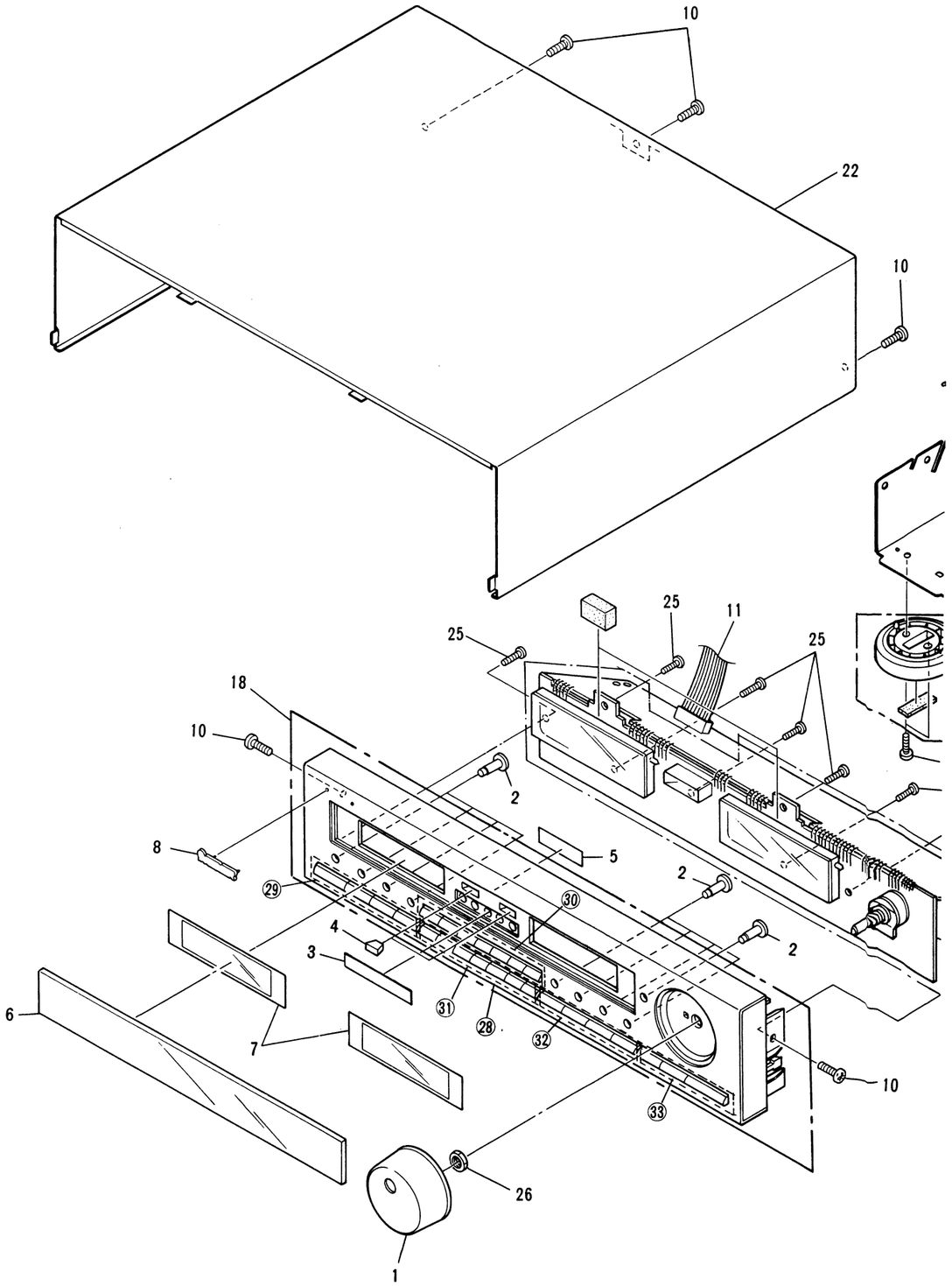
2. EXPLODED VIEWS, PACKING AND PART LIST

NOTES:
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indecates the importance of the safety factor of the part. Therefore, when replacing, be sureto use parts of identical designation.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Mark	NO	Description	Part NO
	1	ROTARY KNOB	AAA1005
	2	KIN BUTTON	AAD1682
	3	PVC PANEL	AAK1767
	4	REFLECTOR	AAK1768
	5	SHEET	AAK1774
	6	DISPLAY PANEL	AAK1853
	7	FL FILTER	AAK1883
	8	NAME PLATE (ABS)	
	9		-------
	10	SCREW	ABA-298
	11	CORD WITH PLUG	ADE1068
	12	PCB SUPPORTER	
	13		-------
	14	FRONT PAD	AHA1270
	15	REAR PAD	AHA1271
	16	PACKING CASE	AHD1780
	17	SHEET	AHG1017
	18	FRONT PANEL ASS'Y	AMB1577
	19	FOOT ASS'Y	
	20	CHASSIS	
	21	REAR PANEL	
	22	BONNET	ANE1211
	23		-------
	24	GE CONTROL ASS'Y	AWK1233
	25	SCREW	BBZ26P080FMC
	26	NUTS	NK70FUC
	27	FOOT ASS'Y	RXA1276
	28	FRONT PANEL	
	29	HINGE KNOB A	
	30	HINGE KNOB B	
	31	HINGE KNOB B	
	32	HINGE KNOB C	
	33	HINGE KNOB D	
	34	DISPLAY ASS'Y	
	35	CONTROL ASS'Y	
	36	CAUTION ("NOTE")	ARH1047



As to the operating instructions, refer to the S-777D/S-555D service manual ARP1930



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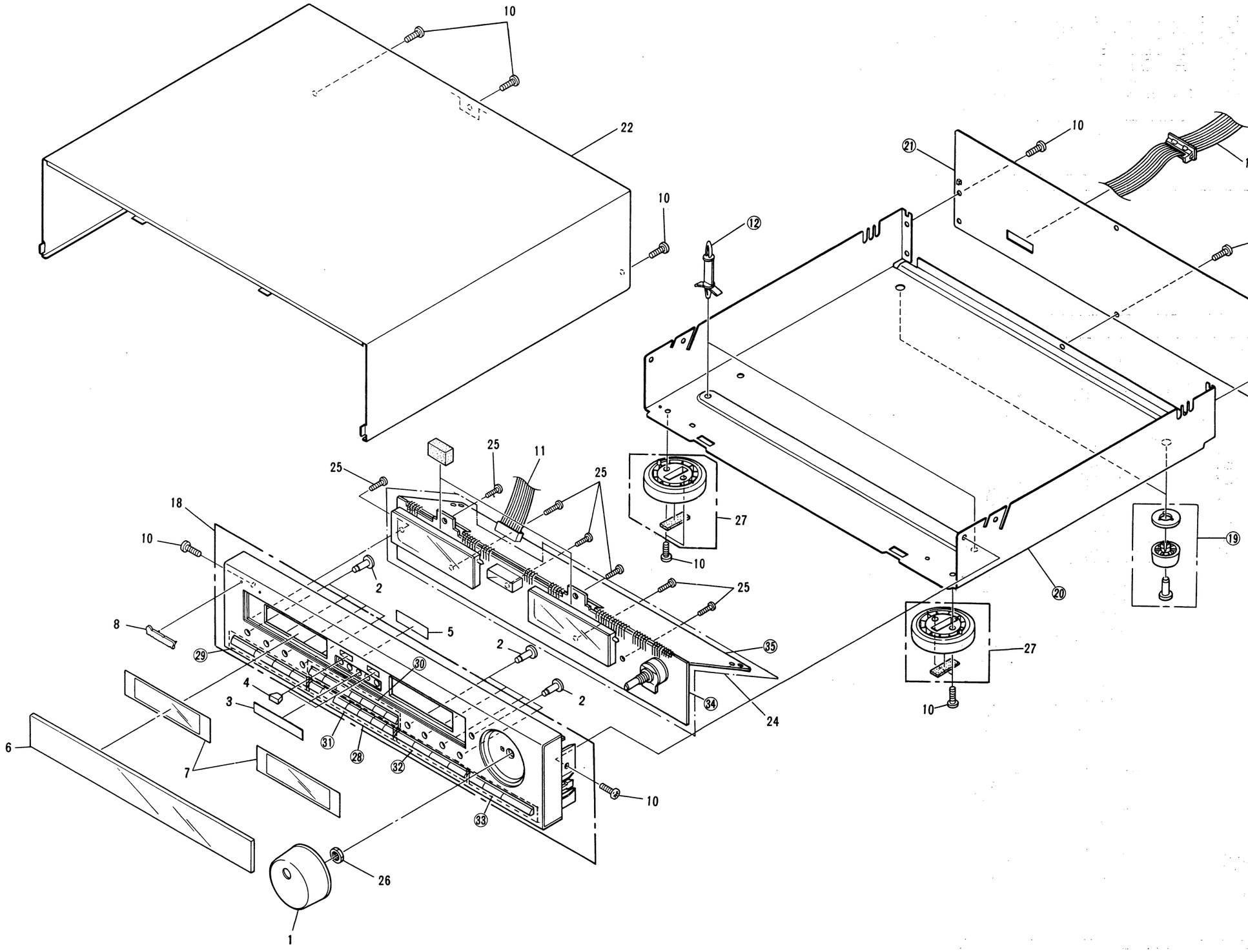


3. SCHEMATIC DIAGRAM

GE CONTROL ASSEMBLY (AWK 1233)

V252 AAV1084 Lch

V251 AAV1084 Rch

S12 60 | 150 | 400 | 1k | 2.4k | 6k | 15k | S12 LEVEL

S13 VIVID | H.P | MILD | CAR | SHARP | ACT | WARM | RANDOM

8G 7G 6G 5G 4G 3G 2G 1G

• Only R channels illuminate for VIVID, MILD, SHARP and WARM while only L channels illuminates for H, P, CAR, ACT, RANDOM.

IC251: RED DRIVER

IC251	M74LS42P
D263-D267	AEL1065
D268	AEL1083
D269-D270	AEL1104
D251-D262	HSS104-02

IC251 (M74CS42P) LOGIC TABLE

IN 12Pin D	13Pin C	14Pin B	15Pin A	OUT 2Pin Q1	3Pin Q2	4Pin Q3	5Pin Q4	6Pin Q5
0	0	0	0	1	1	1	1	1
0	0	0	1	1	1	1	1	0
0	0	1	0	1	1	1	0	1
0	0	1	1	1	1	0	1	1
0	1	0	0	1	0	1	1	1
0	1	0	1	0	1	1	1	1

CONTROL ASSEMBLY

IC101, IC102(1/2): BUFFER

Q101-Q103: MIXER

IC102 (2/2), IC103-IC105, Q104-Q106: B.P.F.

IC101-IC106	NJM4558DXP
IC108	PD3141
IC107	TC4051BP
Q101-Q103, Q107-Q113	DTC124ES
Q114	2SA1048
Q104-Q106, Q115, Q116	2SC2458
D101-D117	HSS104-02
D118	RD5.6ES82

Q107-Q113: B.P.F. RESET

IC106 (1/2): COMPARATOR

IC107: B.P.F. OUTPUT SELECTOR

IC108 : GRAPHIC EQUALIZER CONTROL MICRO COMPUTER

E-VR. BUS CONTROL | IC251 CONTROL | L ch (FL GRID) | ROTARY ENCODER | L ch (FL GRID) | R ch (FL GRID) | FL SEGMENT

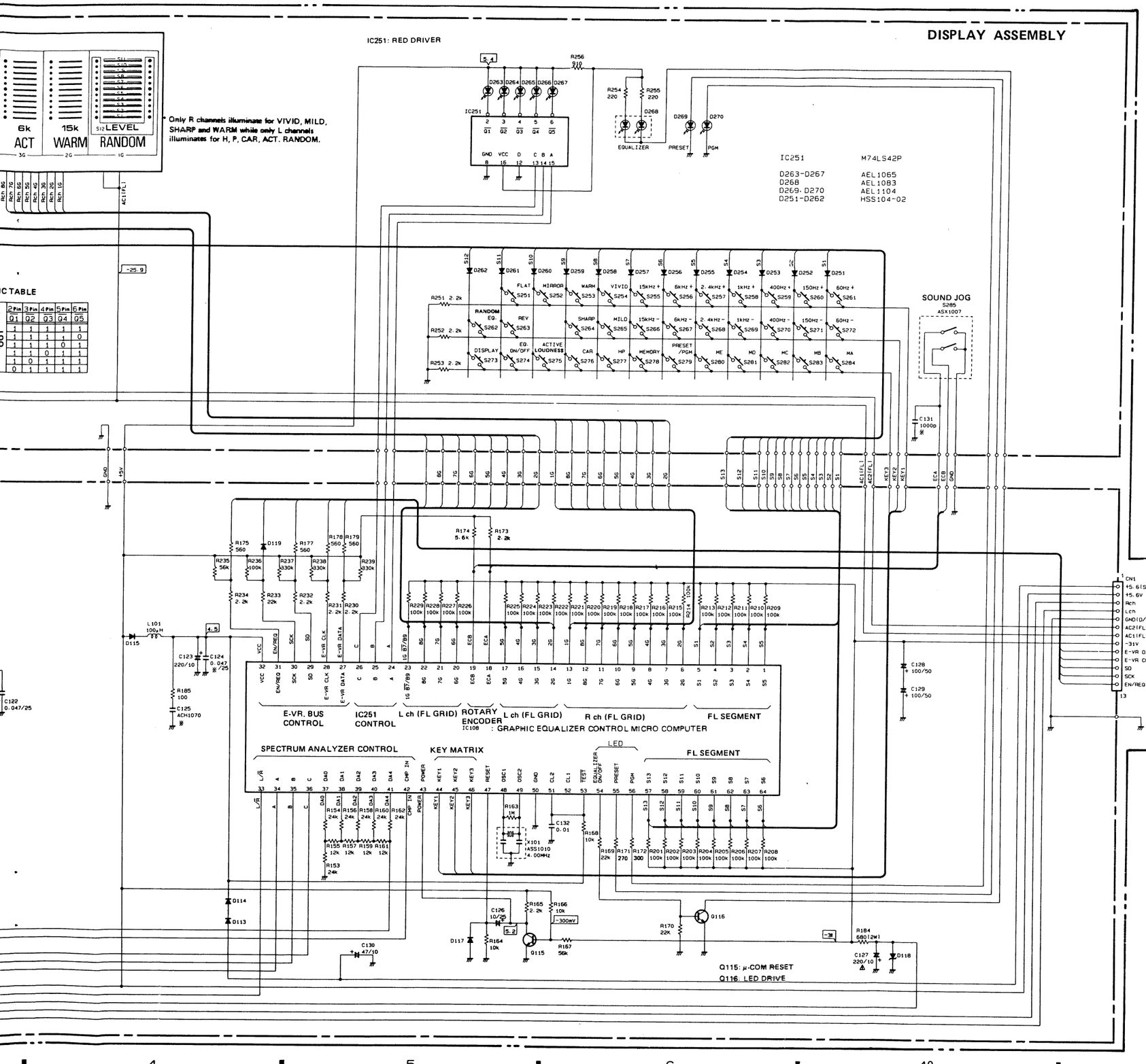
SPECTRUM ANALYZER CONTROL | KEY MATRIX | LED | FL SEGMENT

Q115: μ-COM RESET

Q116: LED DRIVE

ROL ASSEMBLY (AWK 1233)

DISPLAY ASSEMBLY



IC TABLE

	2 Pin	3 Pin	4 Pin	5 Pin	6 Pin
	Q1	Q2	Q3	Q4	Q5
	1	1	1	1	1
	1	1	1	1	0
	1	1	1	0	1
	1	1	0	1	1
	1	0	1	1	1
	0	1	1	1	1

NOTE:

1. RESISTORS:
   Indicated in Ω, 1/8W & 1/4W, ±5% tolerance unless otherwise noted k; kΩ, M; MΩ, (F); ±1%, (G); ±2%, (K); ±10%, (M); ±20% tolerance

2. CAPACITORS:
   Indicated in capacity (μF)/voltage (V) unless otherwise noted p; pF. Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
   ▭; DC voltage (V) at no input signal
   Value in ( ) is DC voltage at rated power.
   mA; DC current at no input signal

4. OTHERS:

   The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
   ※ marked capacitors and resistors have parts numbers.
   This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

SWITCHES: The underlined indicates the switch position.

DISPLAY ASSEMBLY

S251: FLAT
S252: MIRROR
S253: WARM
S254: VIVID
S255: 15kHz +
S256: 6kHz +
S257: 2.4kHz +
S258: 1kHz +
S259: 400Hz +
S260: 150Hz +
S261: 60Hz +
S262: RANDOM EQ
S263: REV
S264: SHARP
S265: MILD
S266: 15kHz –
S267: 6kHz –
S268: 2.4 kHz –
S269: 1kHz –
S270: 400Hz –
S271: 150Hz –
S272: 60Hz –
S273: DISPLAY
S274: EQ. ON/OFF
S275: ACTIVE LOUDNESS
S276: CAR
S277: HP
S278: MEMORY
S279: PRESET/PGM
S280: ME
S281: MD
S282: MC
S283: MB
S284: MA
S285: SOUND JOG

4. P.C. BOARDS CONNECTION DIAGRAM

NOTE

1. This P.C.B connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the following Table.

P.C.B. pattern diagram indication	Corresponding part symbol	Part Name
Q504 (E, B, C)	E or E	Transistor
Q215 (B, C, E)	or	Radiator type transistor
D203	D203	Diode
R237	R237	Resistor
C513	+	Capacitor (Polarity)
C518		Capacitor (Non-polarity)

Others

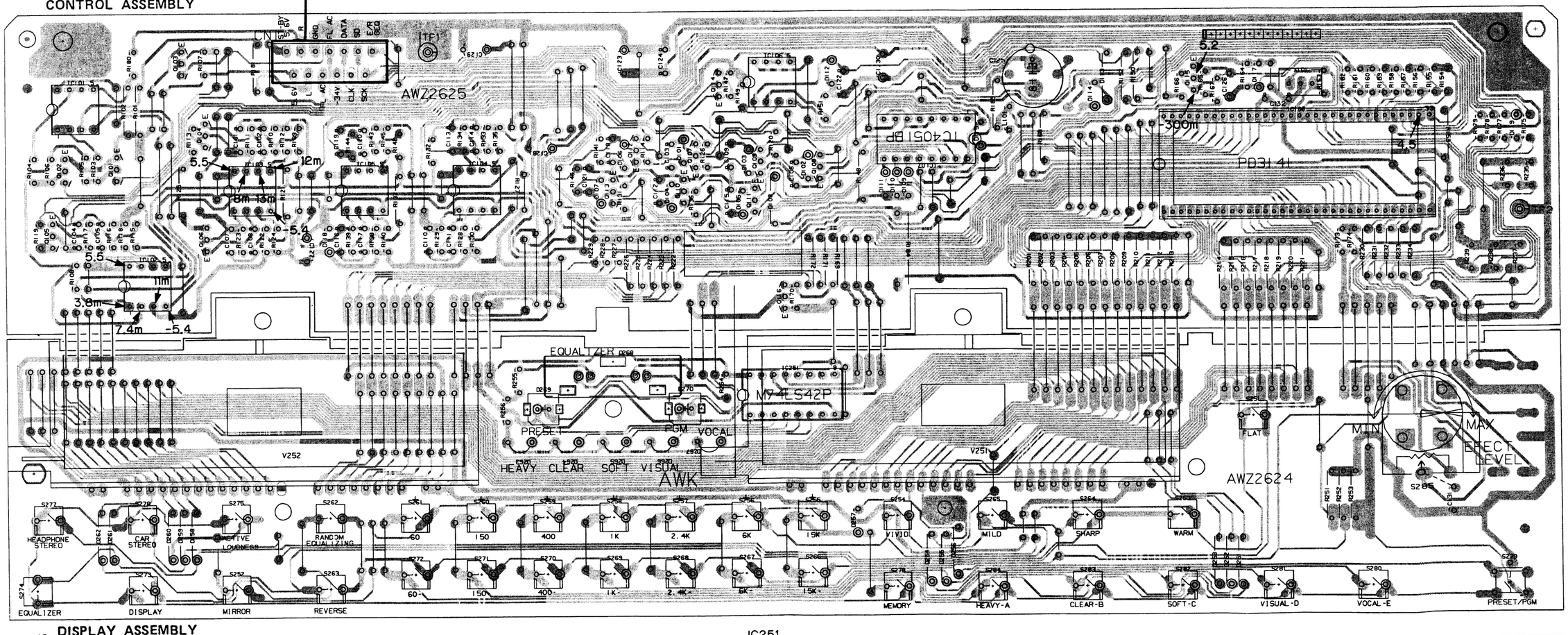
P.C.B. pattern diagram indication	Part Name
IC	IC
S	Switch
RY	Relay
L	Coil
F	Filter
VR	Variable resistor or Semi-fixed resistor

3. The capactor terminal marked with (double circles) shows negatine termianl.
4. The diode terminal marked with (double circles) shows cathode side.
5. The transistor terminal to which E is affixed shows the emitter.

GE CONTROL ASS'Y (AWK 1233)

IC101 IC, Q105 Q102 Q101 IC102 Q104 Q103 Q106 IC103 — A-Z460, A-Z360 AF ASSEMBLY CN204 — IC105 IC104 — Q109 Q116 Q113 Q112 Q110 Q107 Q114 Q111 IC106 Q108 — IC107 — Q115 IC108

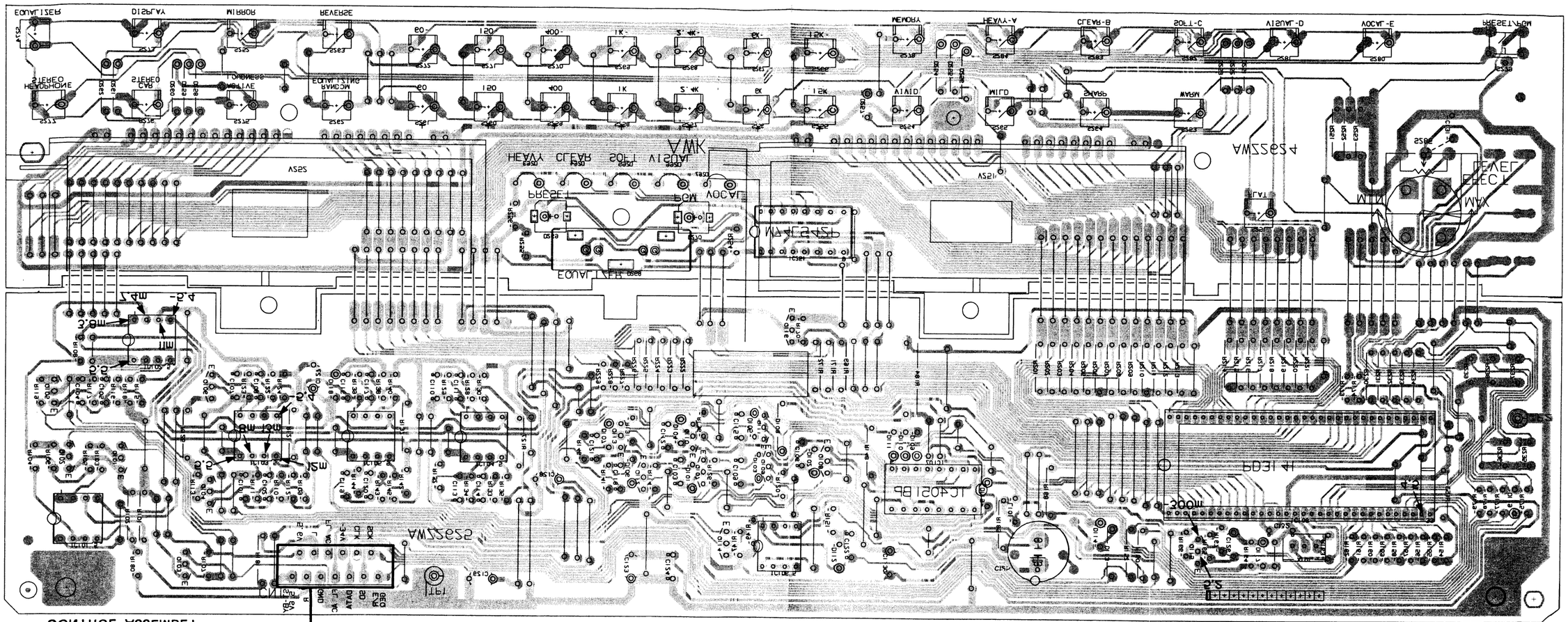
CONTROL ASSEMBLY



DISPLAY ASSEMBLY

IC251

IC DISPLAY ASSEMBLY



CONTROL ASSEMBLY

CE CONTROL ASS'Y (AMK JT33)

A-2460, A-2461
AE ASSEMBLY CN504

This P.C. B. connection diagram is viewed from the foil side.

5. IC INFORMATION

PD3141 (PD3162)

- **General**

The PD3141 controls various functions of the GR-Z460 and SP-Z560.
The basic functions of the GR-Z460 are explained below.

1. Spectrum analysis and FL display

The GR-Z460 always the audio signal detection DC voltage which is A/D converted and split into seven bands x 2, and converts it into the data of eight bands x 2 (level), which are displayed as bar graph on the FL.

2. Control of graphic equalizing electronic VRs (LC7522: IC303 of A-Z460, A-Z360) and FL display

The GR-Z460 controls the electronic VR for equalizing, split into seven bands, and displays the equalizing pattern on the FL as a graph.

3. Monitoring of various keys and control of system bus

The GR-Z460 always monitors the status of 35 keys, and performs operation corresponding to the input signal. It uses 4-wire I/O signal to perform handshaking with the system bus by serial signal, and then executes analysis of the commands which are entered and also provides internal information.

4. Decoding of rotary encoder

In each sound effect program, GR-Z460 raises or lowers the level by the pulse signal sent from the sound job (rotary encoder).

- **PD3141 (PD3162) terminal function**

Pin No.	Terminal name	I/O	Function
1	S5	O	FL segment signal output terminal
2	S4	O	
3	S3	O	
4	S2	O	
5	S1	O	
6	RchG2	O	FL grid signal output terminal (Rch)
7	RchG3	O	
8	RchG4	O	
9	RchG5	O	
10	RchG6	O	
11	RchG7	O	
12	RchG8	O	
13	RchG1	O	
14	LchG2	O	FL grid signal output terminal (Lch)
15	LchG3	O	
16	LchG4	O	
17	LchG5	O	
18	ECA	I	Rotary encoder pulse input (A) (See Fig. 5-1.)
19	ECB	I	Rotary encoder pulse input (B) (See Fig. 5-1.)
20	LchG6	O	FL grid signal output terminal (Lch)
21	LchG7	O	
22	LchG8	O	
23	LchG1 ($\overline{B7}$/B9)		Selection between GR-Z460 and SP-Z560 (See Table 5-1.) and FL grid output (Lch)
24	A	O	Control of M74LS42 (IC251)
25	B	O	Control of M74LS42 (IC251)
26	C	O	Control of M74LS42 (IC251)

Pin No.	Terminal name	I/O	Function
27	EVR DATA	O	A-Z460/A-Z360's LC7522 communication data output
28	EVR CLK	O	A-Z460/A-Z360's LC7522 communication CLK output
29	SD	I/O	System bus data with A-Z460/A-Z360
30	SCK	I	System bus clock with A-Z460/A-Z360
31	EN/REQ (GEQ)	I/O	System bus enable/request with A-Z460/A-Z360
32	Vcc	–	+5V power source
33	L/$\overline{R}$	O	L/R BPF input selection (H: Lch input, L: Rch input)
34	A	O	TC4051BP (IC107) A control (See Table 5-2.)
35	B	O	TC4051BP (IC107) B control (See Table 5-2.)
36	C	O	TC4051BP (IC107) C control (See Table 5-2.)
37	DA0	O	D/A output (for comparison)
38	DA1	O	
39	DA2	O	
40	DA3	O	
41	DA4	O	
42	CMP IN	I	Input for A/D conversion
43	POWER	I	Power ON/OFF input (power supply error detection) (See Table 5-1.)
44	K1	I	Key scan input
45	K2	I	
46	K3	I	
47	RESET	I	Reset signal input
48	OSC2	O	4.18 MHz ceramic oscillator connecting terminal

Pin No.	Terminal name	I/O	Function
49	OSC1	I	4.00 MHz ceramic oscillator connecting terminal
50	GND	–	Ground
51	CL1	I	Pull-up to Vcc (unused)
52	CL2	O	NC (unused)
53	$\overline{TEST}$	I	Pull-up to Vcc (unused)
54	EQUALIZER ON/OFF	O	Equalizer ON/OFF LED control (H: LED ON)
55	PRESET	O	Preset LED control (H: LED ON)
56	PGM	O	PGM LED control (H: LED ON)
57	S13A	O	FL segment output terminal
58	S12A	O	
59	S11A	O	
60	S10A	O	
61	S9A	O	
62	S8A	O	
63	S7A	O	
64	S6A	O	

- **Rotary pulse encoder**

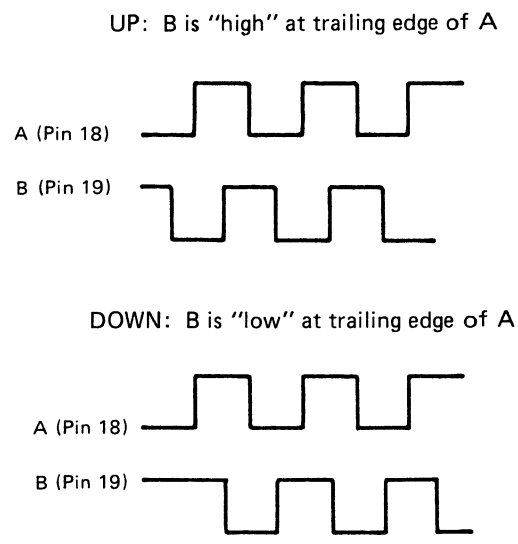


Fig. 5-1 Rotary encoder

- **Port control processing (Special processing)**

Table 5-1 Port control

Pin No.	Terminal name	Function
23	LchG1 (B7/B9)	• GR-Z460/SP-Z560 selection (input) This is set immediately after resetting, or when scanning the keys. H: B9 (SP-Z560) L: B7 (GR-Z460) • FL grid output (Lch)
43	POWER	• POWER ON: H, OFF: L • If this port is "L" continuously for 30 msec after turning OFF power, the backup mode prevails.

- **TC4051BP (IC107) control data**

Table 5-2 IC107 control

Frequency / PD3141 terminal	A (Pin 34)	B (Pin 35)	C (Pin 36)	Switch to be turned ON by TC4051BP (IC107)
15 kHz	0	0	0	a
6 kHz	1	0	0	b
2.4 kHz	0	1	0	c
1 kHz	1	1	0	d
400 Hz	0	0	1	e
150 Hz	1	0	1	f
60 Hz	0	1	1	g

6. SPECIFICATIONS

Graphic equalizer section

Equalizer band

Center frequencies..... 60 Hz, 150 Hz, 400 Hz, 1 kHz, 2.4 kHz, 6 kHz, 15 kHz

Variable range ..... ± 7 dB

Spectrum analyzer section

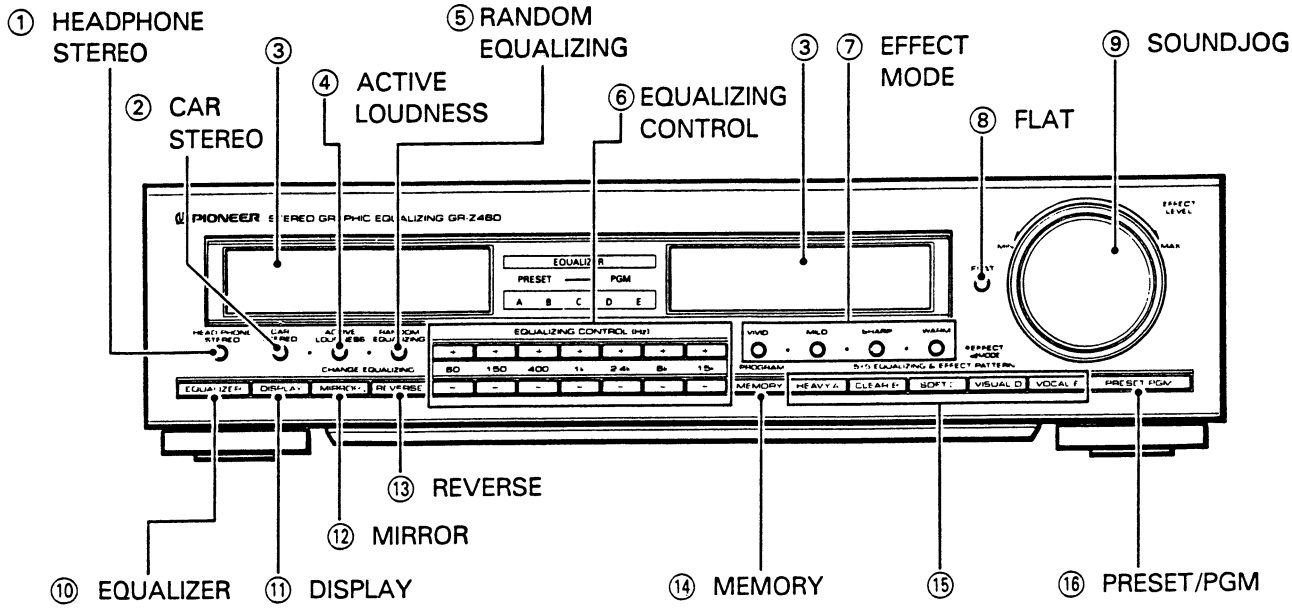
Center frequencies..... 60 Hz, 150 Hz, 400 Hz, 1 kHz, 2.4 kHz, 6 kHz, 15 kHz

Miscellaneous

Dimensions ..... 360 (W) x 332 (D) x 90.5 (H) mm

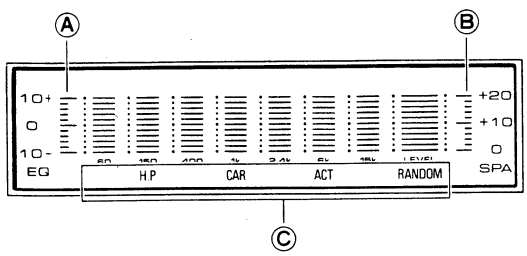
Weight (without package) ..... 2.2 kg

7. PANEL FACILITIES

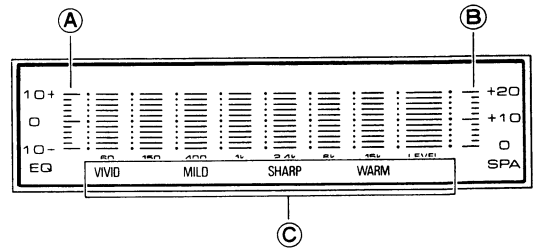


Display section

(left)



(right)



① HEADPHONE STEREO switch
Press this switch to recall the optimum equalization settings when recording a tape for headphone stereo listening.

② CAR STEREO switch
Press this switch to recall the optimum equalization settings when recording a tape for car stereo listening.

③ Display section

④ ACTIVE LOUDNESS switch
This switches the active loudness function ON and OFF. Depending on the volume setting on the amplifier, this function automatically boosts bass and treble response.

⑤ RANDOM EQUALIZING switch
This switches the random equalizing function ON. Random equalization patterns for the seven frequency bands are automatically created by this function.
Each time you press it, you get a new equalization pattern. If you press a switch for another operation, for example the REVERSE switch, RANDOM EQUALIZING switches OFF.

⑥ EQUALIZING CONTROL switches
Use these to adjust equalization of each frequency band.

⑦ EFFECT MODE switch
Use this to recall previous effect mode settings. After recalling the effect mode, you can adjust the effect level with SOUNDJOG ⑨.

⑧ FLAT switch
Use this to make all equalization patterns flat.

⑨ SOUNDJOG dial (EFFECT LEVEL control)
Recall the effect mode with the EFFECT MODE switch ⑦, and then adjust effect level with this dial.

⑩ EQUALIZER switch
Turns the equalizer on and off. The EQUALIZER indicator lights when this switch is on.

NOTE:
Adjustment of the sound with the graphic equalizer is not possible when CD DIRECT or DAT DIRECT are ON.

⑪ DISPLAY switch
Use this to change between equalizer and spectrum analyzer display.

⑫ MIRROR switch
Press this switch to change treble and bass equalization patterns in the 1kHz frequency band.

⑬ REVERSE switch
Press this switch to reverse equalization settings so that boosted frequencies will be reduced and vice versa.

⑭ MEMORY switch
Used for storing equalization curves you input in the memory recall switches (A - E).

⑮ Memory recall switches
Used for recalling equalization curve.

⑯ PRESET/PGM(PROGRAM) switch
Determines whether the equalizer curves recalled by the Memory recall switches are your memorized curves or factory preset curves.

Ⓐ Scale for graphic equalizer display which shows the degree of equalization.
Ⓑ Scale for spectrum analyzer display which shows sound signal strength of the various bands.
Ⓒ This display shows whether the effect mode, record mode, active loudness and random equalizing are ON or OFF.